IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Previously Presented): A microreactor for obtaining hydrogen gas by reforming a feed material, comprising:

a metal substrate having a microchannel portion on one surface thereof,

an insulating film formed on an other surface of the metal substrate where the microchannel portion is not formed,

a heater provided on the insulating film on the other surface of said metal substrate such that a front surface of the heater contacts the insulating film and a back surface of the heater includes a heater protective layer that covers said heater while exposing only electrodes extending from the back surface of the heater, the electrodes being configured to energize the heater,

a catalyst supported on said microchannel portion, and

a cover member having a feed material inlet and a gas outlet and joined to said metal substrate so as to cover said microchannel portion to form a single continuous flow path, wherein the feed material inlet and the gas outlet are substantially perpendicular to axial directions of the single continuous flow path.

Claim 2 (Original): A microreactor according to claim 1, wherein said metal substrate is one of an Al substrate, a Cu substrate, and a stainless substrate.

Claim 3 (Original): A microreactor according to claim 1, wherein said insulating film is a metal oxide film formed by anodically oxidizing said metal substrate.

Claim 4 (Original): A microreactor according to claim 3, wherein said metal oxide film is also provided in said microchannel portion.

Claim 5 (Original): A microreactor according to claim 4, wherein said metal substrate is an Al substrate.

Claim 6 (Canceled).

Claim 7 (Previously Presented): A production method of a microreactor for obtaining hydrogen gas by reforming a feed material, comprising:

forming a microchannel portion on one surface of a metal substrate;

anodically oxidizing said metal substrate to form an insulating film in the form of a metal oxide film;

providing a heater on said metal oxide film on an other surface, where said microchannel portion is not formed, of said metal substrate such that a front surface of the heater contacts the insulating film and a back surface of the heater includes a heater protective layer that covers said heater while exposing only electrodes extending from the back surface of the heater, the electrodes being configured to energize the heater;

applying a catalyst to said microchannel portion; and

joining a cover member formed with a feed material inlet and a gas outlet to said metal substrate so as to cover said microchannel portion to form a single continuous flow path, wherein the feed material inlet and the gas outlet are substantially perpendicular to axial directions of the single continuous flow path.

Claim 8 (Previously Presented): A production method of a microreactor for obtaining hydrogen gas by reforming a feed material, comprising:

forming a microchannel portion on one surface of a metal substrate;

providing an insulating film on an other surface, where said microchannel portion is not formed, of said metal substrate;

providing a heater on said insulating film such that a front surface of the heater contacts the insulating film and a back surface of the heater includes a heater protective layer that covers said heater while exposing only electrodes extending from the back surface of the heater, the electrodes being configured to energize the heater;

applying a catalyst to said microchannel portion; and

joining a cover member formed with a feed material inlet and a gas outlet to said metal substrate so as to cover said microchannel portion to form a single continuous flow path, wherein the feed material inlet and the gas outlet are substantially perpendicular to axial directions of the single continuous flow path.

Claims 9-17 (Canceled).

Claim 18 (Previously Presented): A microreactor for obtaining hydrogen gas by reforming a feed material, comprising:

a joined body comprising a metal substrate provided with a microchannel portion on one surface thereof, and a metal cover member having a feed material inlet and a gas outlet and joined to said metal substrate so as to cover said microchannel portion to form a single continuous flow path, the single continuous flow path formed by said microchannel portion located inside said joined body and said metal cover member, a catalyst supported on a whole inner wall surface of said flow path, an insulating film formed on an other surface of the

metal substrate where the microchannel portion is not formed, and a heater provided on the insulating film on the other surface such that a front surface of the heater contacts the insulating film and a back surface of the heater includes a heater protective layer that covers said heater while exposing only electrodes extending from the back surface of the heater, the electrodes being configured to energize the heater,

wherein the feed material inlet and the gas outlet are substantially perpendicular to axial directions of the single continuous flow path.

Claim 19 (Withdrawn): A microreactor according to claim 18, wherein said flow path has no angular portion on the inner wall surface along a fluid flow direction.

Claim 20 (Withdrawn): A microreactor according to claim 18, wherein the catalyst is supported on the inner wall surface of said flow path via a metal oxide film.

Claim 21 (Withdrawn): A microreactor according to claim 20, wherein said metal oxide film is formed by anodic oxidation of said metal substrate and said metal cover member.

Claim 22 (Withdrawn): A microreactor according to claim 20, wherein said metal oxide film is formed by a boehmite treatment.

Claim 23-29 (Canceled).

Claim 30 (Previously Presented): A production method of a microreactor for obtaining hydrogen gas by reforming a feed material, comprising:

forming a microchannel portion on one surface of a metal substrate;

joining a metal cover member having a feed material inlet and a gas outlet to said metal substrate so as to cover said microchannel portion to thereby form a joined body having a single continuous flow path, wherein the feed material inlet and the gas outlet are substantially perpendicular to axial directions of the single continuous flow path;

forming a metal oxide film on an inner wall surface of said flow path;

applying a catalyst to the inner wall surface of said flow path via said metal oxide film; and

providing a heater on an insulating film formed on an other surface, where said microchannel portion is not formed, of said metal substrate such that a front surface of the heater contacts the insulating film and a back surface of the heater includes a heater protective layer that covers said heater while exposing only electrodes extending from the back surface of the heater, the electrodes being configured to energize the heater.

Claim 31 (Previously Presented): A production method of a microreactor according to claim 30, wherein said forming the metal oxide film forms said metal oxide film by anodically oxidizing said metal substrate and said metal cover member.

Claim 32 (Previously Presented): A production method of a microreactor according to claim 30, wherein said forming the metal oxide film forms said metal oxide film by a boehmite treatment.

Claim 33 (Previously Presented): A production method of a microreactor according to claim 30, wherein said forming the microchannel portion forms said microchannel portion on said metal substrate such that a section thereof becomes U-shaped or semicircular, and no angular portion exists on a wall surface along a flow direction.

Claim 34 (Previously Presented): A production method of a microreactor according to claim 30, wherein said applying the catalyst fills the flow path of said joined body with a catalyst suspension, then removes said catalyst suspension and dries the inside of the flow path.

Claim 35 (Previously Presented): A production method of a microreactor according to claim 34, wherein said applying the catalyst gives vibration or rotation to said joined body upon drying.

Claims 36-58 (Canceled).